

<u>Mission</u> Lunar Reconnaissance Orbiter (LRO)	<u>Date</u> 28 October 2008
<u>Report Title</u> Detector Damage Threshold Summary	<u>SER Status/Revision</u> -
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<u>Scope/Purpose:</u> The purpose of this Engineering Report is to document the damage thresholds of interest to the ILRS community for the LRO LR detector.	

Sufficient light energy impinging on the LR telescope in the wavelength range 532.05 nm – 532.35 nm can damage the LR detector (LOLA Channel 1) and disable the Laser Ranging System.

Through vendor specifications for the LR detector and from measurement and analysis of the LR flight optical system, a peak power flux greater than 0.32 mW/cm² at the entrance to LR Telescope while the detector is powered will exceed the detector damage threshold. Furthermore, a flux greater than 32 W/cm² at the LR Telescope while the detector is unpowered will also exceed the detector damage threshold.

We have established a threshold value for the peak power output (pulse energy divided by the pulse width) of laser ranging sites to distinguish sites that may possibly damage the LR detector. Sites below this threshold value have a negligibly small risk of damaging the LR detector. Sites with a peak power flux above the threshold may risk damaging the LR detector and care should be taken to understand the atmospheric conditions and energy output for these sites. This threshold value should be considered only as a “threshold of interest” to trigger further scrutiny, not as a condition of acceptability for the site.

The threshold value for laser ranging site peak power output is 0.07 mW/cm².